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General information.

The general state of health at Rio de Janeiro is favorable. The smallpox that has prevailed here for some time has, indeed, decreased; the epidemic, however, continues. In the first week of October there were 58 deaths and 70 notified cases; in the next week there were only 48 deaths, but 122 notified cases, and there followed again an increase, 67 deaths being recorded. Cases of smallpox are spread over the whole city.

It is surprising that at this unusually early date there have already occurred cases of yellow fever, some of which have been fatal. In the first week of October there were 4 deaths, then occurred 6, and in the last week 3. That may be a symptom that the coming summer season will promote the development of yellow fever.

The state of health in the shipping is good.

At present, the greatest interest is taken in those cases of illness that have occurred at Santos, and which are considered as plague. In regard to this question I have sent to you a special report.

Bills of health.

Since last report the following-named ships have been inspected and received bills of health of this office: October 18, steamship *Coleridge*, British, for New York. October 20, steamship *Asiatic Prince*, British, for New York. October 23, bark *Landskrova*, British, for Barbados and United States.

Respectfully,

W. HAVELBURG, M. D.,

Acting Assistant Surgeon, U. S. M. H. S.

The SURGEON-GENERAL,

U. S. Marine-Hospital Service.

Sanitary improvements proposed in 1893 for Santos.

[Letter No. 1.]

NEW YORK, N. Y., *November 20, 1899.*

SIR: I beg to acknowledge your favor of the 6th instant concerning the methods proposed for the abatement of yellow fever in Santos, Brazil, and will be very glad to tell you what I can regarding the matter. I have been so very busy with an urgent piece of work of late that I have been unable to reply sooner.

I regret exceedingly that I can not send you a copy of our report, but the edition was limited to 100 copies, and these were placed in public libraries and institutions in various parts of the world. There is a copy of the report in the Congressional Library, but there is no copy there of the plans. These were not published by us, but were redrawn and lithographed later in Brazil, and I have a set that I can lend you if you wish to look them over.

The studies were made at the request of the governor of the State of Sao Paulo, of which Santos is the seaport and the point from which most of the coffee of the State is shipped. The town is a small place of about 25,000 people, the better class of merchants not residing in Santos, but in Sao Paulo, on the elevated plateau, 30 miles back from the seacoast. As the works necessary to protect the place would be very expensive, and as the protection afforded by them would be to the financial advantage of the State, as well as the city of Santos, the two

joined in the expense of the investigations. The commission to make the studies was intrusted to my father, Prof. E. A. Fuertes, of Cornell University, under contract, and he associated with himself, as consulting engineers, Mr. Rudolph Hering and myself. In 1893, in company with my father, I visited Rio, Sao Paulo, and Santos, and spent several months studying the situation, collecting data, and having surveys made. These data were brought to this country, and from them the report was written.

The recommendations were, briefly, to clean the town, build sewers and drains, improve their water supply, pave the streets, remodel the plumbing methods and the character of the urban houses, provide for a quarantine station, the burning of the city refuse, the draining of the swamps about the city, and the construction, in proper locations, of hospitals for yellow fever and smallpox. I regret to say, that although the report was well received, political changes occurring soon after made it impossible to carry the works into effect, excepting as to the cleaning of the town and, to a certain extent, inspecting vessels coming to the port, sending those found to be infected up to Rio de Janeiro to the Government quarantine station. It is not impossible that the matter may come up again when the political situation is more healthy.

Our report was quite voluminous and contains, beside the recommendations, a set of specifications for all the works recommended, and regulations for quarantine, plumbing and building, and general health regulations.

I would be very glad to place in your hands any matter I may have that would be of value to you. With kind regards, believe me,

Respectfully,

JAMES H. FUERTES.

The SURGEON-GENERAL,

U. S. Marine-Hospital Service.

[Letter No. 2.]

NEW YORK, N. Y., *November 23, 1899.*

SIR: Your kind favor of recent date requesting information regarding the methods that were proposed some time ago for relieving Santos, Brazil, from the severe epidemics of yellow fever which have occurred there at frequent intervals has been received. It gives me great pleasure to send you a brief account of the local conditions and of the scope of the investigations that were made to afford relief.

Santos is a small city on the Atlantic coast, some three hundred miles south of Rio de Janeiro. It is situated on a plain formed from the disintegrated washings of the Sierra do Mar, skirting the coast, at the foot of a steep pass leading to an elevated plateau in the state of Sao Paulo, one of the most productive coffee districts of Brazil. The population of the city is made up largely of laborers dependent upon the coffee interests for their living, the better merchants of the place residing in the city of Sao Paulo, the capital of the state, 30 miles inland. The importance of the place in the world's commerce may be appreciated from the fact that in 1891 the total shipping amounted to 808,000 tons. During that year began the worst yellow fever epidemic the place ever experienced. In the first six months of 1892 10 per cent of the population died from the disease. It was not confined to Santos alone, however, but was carried into the coffee district by refugees and, probably, also in the coffee sacks and other freight, and the country soon became thoroughly alarmed.

This state of affairs prompted the Government to take the matter up,

and it resulted in the engagement of Prof. E. A. Fuertes, of Cornell University, to study the problem, with a view of suggestions, on his part, of such methods as would wipe out the disease and prevent its recurrence. To aid in carrying on these investigations Professor Fuertes associated with himself Mr. Rudolph Hering, C. E., and myself. The result of these studies brought out that Santos was naturally a city with a healthful climate, a very good natural harbor, and a geographical position well suited to develop the commerce of the rich state of which it is the only seaport; that yellow fever, smallpox, and other infectious diseases were importations and had become endemic from the local conditions which favored their growth and development.

The city is very flat and most of it is but a few feet above sea level. As a result it is surrounded by large areas of fresh-water swamps, because the heavy surf from the ocean throws up a dike of sand along the sea front, thus holding back the waters of the streams from the mountains, except in times of very heavy rains, when the large flows break through and for a time relieve the swamps of their surplus water.

The town had already a system of sewers, but they were laid on very flat grades and in some cases had no slope, the putrefying sewage filling long lines of mains and giving off offensive odors, as well as infecting the subsoil. The sewage was collected at a pumping station at the edge of the town and discharged into the harbor on the mud flats, a pretense of chemical treatment being made in some small settling basins. The works as administered were thoroughly inefficient, and it was evident that, in view of their imperfect construction and inadequate sizes, they would have to be reconstructed, especially as the point of discharge of the effluent was in a very unfavorable place, and as there was a good location for it a little further down stream.

There were also a number of drains, with walls laid without mortar, leading under the business portions of the town, running under the buildings and almost impossible to trace. The filth in these was carried back and forth by the tides, and their embouchures were into the harbor, through the walls upon which the vessels discharged their cargoes. In the central portion of the business district there is a depression of the grade of the street, thus forming a pocket in which the surface water collected during heavy rains on account of the stoppage of an untraceable drain, and the store proprietors in the region built masonry dams about 3 feet high across the doorways to prevent this flood water from entering the stores and ruining their stocks.

The houses were built in the manner characteristic of the country, being, generally, one story in height, of masonry, and with no cellars or ventilation under the floors, with no windows in the interior rooms, and with the most primitive sanitary arrangements. The streets and yards of houses were often in a most filthy condition and personal habits of cleanliness and decency were on every hand observed to be violated to a disgusting degree. On the sidewalks of the side streets, in the heart of the town, deposits of fecal matter were frequently to be observed, and the drains from the urinals, located often against the fronts of houses, commonly discharged their contents in the street gutters. An effort was made by the city authorities to mitigate the evil by disinfecting these places with chloride of lime, but various distinctive odors on a hot moist day were in strong evidence all over the town.

The city had acquired such an unsavory reputation with ship owners, on account of yellow fever, that one line purchased an island outside of the harbor, upon which they disembarked the crews of their vessels

when reaching port, sending the vessel to the harbor by native crews picked up for the purpose. There being no quarantine station, ships were sometimes refused admission to the harbor and were sent back to the Government station at Rio de Janeiro, often imposing great hardships on the ship owners as well as on the merchants who expected goods on them or were waiting to ship coffee.

The recommendations of the report were, briefly, to establish an efficient quarantine station, with the necessary houses for observation, hospitals, etc., with proper regulations to govern the exercise of quarantine; to clean up the town, establish proper public conveniences, bath and wash houses; to build hospitals in proper locations for the treatment of yellow fever, smallpox, and other infectious diseases; to construct efficient sewers and drains; to drain the fresh-water swamps surrounding the city; to increase the water supply and improve the distribution system in the city; to pave the streets with impervious pavements; to inaugurate a good system of collecting and removing the refuse and garbage of the city and destroy it in furnaces; and to bring about a gradual change in the manner of constructing houses, to permit proper lighting and ventilation as well as to adopt proper methods of plumbing. The improvement of the harbor had been already undertaken, and promised to give every facility needed by the large and growing business of the town.

The report was well received and it was expected that work would soon be undertaken, but, unfortunately, the country became involved in a civil war that taxed the resources very heavily, and this, as well as political complications, postponed operations. The city, however, carried out the recommendations as far as it could, as to the general sanitary care of the streets and public places, and to some extent also in the matter of keeping a closer watch on incoming vessels from suspected ports.

Most of the infection was imported from the north, very little coming from the south. Undoubtedly, however, yellow fever held over from season to season, as is the case in Rio de Janeiro, where it is nearly always present. There is no doubt that this port can be freed from this plague and kept free from it. Prior to the time when this port assumed such importance as a shipping point for large quantities of coffee, yellow fever was unknown there. But habits of carelessness natural to the poor and ignorant immigrants brought over to work the plantations, and an apparent impossibility of controlling these in their habits by the relatively few merchants, has prepared the way to sow there the seeds of all sorts of infectious diseases, which find a proper nidus for retaining life in decomposing organic matter exposed to the air, where it may be picked up by the winds and scattered among those who might otherwise escape from the dire consequences attending filthy habits in tropical and semitropical countries.

In view of the fact that plague has now invaded this unfortunate country, it is to be regretted that the works outlined had not been conscientiously carried out. Once more the customary salutation of the nightly parting of friends in business will be "good-bye" instead of "good-night."

I would be very glad to give you, if you desire it, any further information in my possession regarding this matter to aid you in your very laudable desire to educate public sentiment up to the point where the public will realize the great amount of good that can be accomplished by the calling together of a general congress of sanitarians to consider and inaugurate the means for banishing forever from this hemisphere

these pestilential scourges. The good that could be done by such a convention and the mutual arrangements that could be made by the different countries interested would undoubtedly result in a saving of life and capital enormously in excess of the cost of bringing about the results.

Respectfully,
The SURGEON-GENERAL,
U. S. Marine-Hospital Service.

JAMES H. FUERTES.

Plague at Santos.

RIO DE JANEIRO, *October 25, 1899.*

SIR: On October 18 the government of the State of Sao Paulo officially declared the existence of the plague in the city of Santos. Therefore, on the 19th, after conferring with the legation, I sent you a dispatch saying that the plague is now present in Santos. There have been 6 cases and deaths. Autopsy confirms diagnosis. Isolation is possible.

I beg to report to you all the facts that have occurred at Santos and that form the basis for the official declaration.

A few days ago there was treated in the Hospital de Santa Casa de Misericordia at Santos a person with 40° C. of fever and 2 buboes in the groin. This patient died twenty-four hours after entering the hospital, and although the disease somewhat resembled yellow fever, some of the symptoms, which have never been observed in this disease, led to doubt on the subject in the opinion of the attending physician.

Two patients, Italians, adults, living in the same street, have been observed. Both had inguinal buboes and fever, although not violent. One died. The other is at the isolation hospital. In the case of this patient, and of some others who have been sent to the isolation hospital, it has since been recognized that they were not suffering from plague.

Finally appeared 3 cases at the house of Mr. Milone, owner of a restaurant and saloon in the center of the city. One was that of a clerk, a Brazilian; another was that of a servant girl, and the third was that of a daughter of Mr. Milone, 16 years of age. All three were taken to the isolation hospital. The clerk died; on his body there were several buboes. The servant girl had been ill six days before entering the hospital, and the daughter had been taken ill on the previous night.

The authorities made inquiries in regard to the origin of the disease and it was supposed that it had been carried to Santos from Oporto by the steamer *Rei de Portugal*. The steamer lay alongside the wharf several days after quarantine had been declared by the federal government.

Informed of this, the secretary of interior of Sao Paulo immediately telegraphed to the minister of the interior of the federal government soliciting his action in the matter. The minister answered that the *Rei de Portugal* was not subject to quarantine because it had left Oporto on July 31, while quarantine had been declared only for vessels that had left on or after August 1.

Fifteen or twenty days after the arrival of the *Rei de Portugal* at Santos there was observed in that city an extraordinary mortality among the rats, which still continues. This fact was at once communicated to the director of the sanitary service of Sao Paulo. Dr. Ribas went to Santos with Dr. Lutz, director of the bacteriological institute, and carried from there to Sao Paulo several dead rats, preserved in ice.

The examination, made at the institute, disclosed no microbe of the plague.